UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/047,556	10/23/2001	Martin Klein	H 2182	4171

1218 7590 07/21/2006

CASELLA & HESPOS
274 MADISON AVENUE
NEW YORK, NY 10016

EXAMINER	
LEE, SHUN K	

ART UNIT	PAPER NUMBER
2884	

DATE MAILED: 07/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/047,556	KLEIN ET AL.	
	Examiner	Art Unit	
	Shun Lee	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5,6,8-10,13-15,17 and 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,6,8-10,13-15,17 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 May 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20060508*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Europe on 24 October 2000. It is noted, however, that applicant has not filed a certified copy of the 00 122 360.1-2208 application as required by 35 U.S.C. 119(b).

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

3. Claim 1 is objected to because of the following informalities: "the converter device" on line 20 in claim 1 should probably be --each said converter device--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 2, 5, 6, 8-10, 13-15, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danielsson *et al.* (US 6,429,578) in view of Gleason (US 3,956,654).

In regard to claims **1**, **2**, **8**, **9**, and **15**, Danielsson *et al.* also disclose (Figs. 2a, 2b, 3, 7a, 7b, and 9) a detector for detecting electrically neutral particles, comprising:

(a) a detector housing (column 7, lines 2-14) which at least in certain regions is filled with a counting gas,

(b) a multiplicity of the converter devices (202, 302a, 302b, 302c, 302d, 700, 902a, 902b, 902c, 902d) arranged in cascade form in the detector housing for generating conversion products (*e.g.*, electrons; column 7, lines 49-54) as a result of the absorption of the neutral particles (*e.g.*, neutrons; column 13, lines 9-11) which are to be detected, the conversion products generating electrically charged particles (*e.g.*, electrons; column 7, lines 54-56) in the counting gas, each of said converter device (202, 302a, 302b, 302c, 302d, 700, 902a, 902b, 902c, 902d) comprising an insulator layer (204, 706, 710) having first and second surfaces, a first conductive layer (206, 704) and a second conductive layer (208, 712) disposed respectively

on the first and second surfaces of the insulator layer (204, 706, 710) such that the first (206, 704) and second (208, 712) conductive layers are electrically insulated from one another by the insulator layer (204, 706, 710), at least one converter layer (*e.g.*, 708), each said converter device (202, 302a, 302b, 302c, 302d, 700, 902a, 902b, 902c, 902d) has a multiplicity of passages for the electrically charged particles (column 6, lines 14-16), the first conductive layer (206, 704) and the second conductive layer (208, 712) are electrically connected to a device for generating a converter field, wherein the insulator layer (204, 706, 710) in each of said converter device (202, 302a, 302b, 302c, 302d, 700, 902a, 902b, 902c, 902d) is the only insulator layer thereof (*e.g.*, 204).

(c) at least one readout device (314, 914) for detecting (column 8, lines 36-50) the electrically charged particles; and

(d) at least one electrical drift field device (200, 304a, 304b, 304c, 304d, 304e, 306, 700, 904a, 904b, 904c, 904d, 904e, 906) for generating an electrical drift field for the electrically charged particles in at least a region of the volume of the counting gas in such a manner that at least some of the electrically charged particles drift (*i.e.,* charge collect; column 8, lines 25-35) toward the readout device (314, 914), the converter device (202, 302a, 302b, 302c, 302d, 700, 902a, 902b, 902c, 902d) being of charge-transparent design (*i.e.*, perforated; column 7, lines 39-47) and being arranged in the detector housing in such a manner that the drift field passes through at least part of each said converter device (202, 302a, 302b, 302c, 302d, 700, 902a, 902b, 902c, 902d).

While Danielsson *et al.* further disclose (Figs. 7a and 7b; claims 11 and 18) that at least one converter layer (*e.g.*, 708) can be integrated into a GEM structure (202, 704, 706, 710, 712) with first and second conductive layers comprising copper (column 6, lines 31-34), the detector of Danielsson *et al.* lacks an explicit description that the at least one converter layer is arranged on at least one of the first conductive layer and the second conductive layer to define an outermost part of each said converter device, the converter layer (*e.g.*, neutron converter layer) being formed of a material (*e.g.*, at least one of lithium-6, boron-10, gadolinium-155, gadolinium-157 and uranium-235) different than the conductive layer on which the converter layer is arranged. However, neutron converter layers are well known in the art. For example, Gleason teaches (column 1, lines 9-36) that boron-10 is a widely used converter layer for detecting neutrons. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to arrange boron-10 on the copper conductive layer in the modified apparatus of Danielsson *et al.*, in order to detect neutrons.

In regard to claim **5** which is dependent on claim 1, Danielsson *et al.* also disclose (Figs. 3 and 9) that a region of each said converter device (202, 302a, 302b, 302c, 302d, 700, 902a, 902b, 902c, 902d) which is active in the conversion is arranged substantially perpendicularly in the drift field.

In regard to claim **6** which is dependent on claim 1, Danielsson *et al.* also disclose (Figs. 2a, 2b, 3, 7a, 7b, and 9) that the device (200, 304a, 304b, 304c, 304d, 304e, 306, 700, 904a, 904b, 904c, 904d, 904e, 906) for generating a drift field has a

structured drift electrode (206, 208, 306, 704, 712, 906) to generate the drift field between the drift electrode and the readout device (314, 914).

In regard to claim **10** which is dependent on claim 9, Danielsson *et al.* also disclose (column 6, lines 24-56) that the first and second conductive layers have a layer thickness of 5 μm (*i.e.*, from 0.1 μm to 20 μm) and the insulator layer has a layer thickness of 50 μm (*i.e.*, from 10 μm to 500 μm). The detector of Danielsson *et al.* lacks that the neutron converter layer has a 0.5 μm and 3 μm layer thickness. However, neutron converter layers are well known in the art. For example, Gleason teaches (column 1, lines 9-36) that a neutron converter layer comprises an absorptive coating of a material having a high neutron cross-section such as boron-10. In addition, Danielsson *et al.* further disclose (column 13, lines 9-11) that the detector can be optimized for detecting neutrons as is known in the art. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to optimize the thickness (*e.g.*, from 0.5 μm and 3 μm) of a boron-10 absorptive coating as the converter layer in the detector of Danielsson *et al.*, in order to detect neutrons with a desired efficiency.

In regard to claims **13** and **17**, the method steps are implicit for the modified apparatus of Danielsson *et al.* since the structure is the same as the applicant's apparatus of claims 1, 2, and 15.

In regard to claim **14** and **18**, the method steps are implicit for the modified apparatus of Danielsson *et al.* since the structure is the same as the applicant's apparatus of claims 1, 2, and 15.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Danielsson *et al.* (US 6,429,578) in view of Gleason (US 3,956,654) as applied to claim 2 above, and further in view of Sauli (US 6,011,265).

In regard to claim **3** which is dependent on claim 2, while Danielsson *et al.* also disclose (column 7, lines 39-41) that the passages are aligned with the holes in the GEM structure, the modified detector of Danielsson *et al.* lacks an explicit description that the passages have a minimum diameter of between 10 μm and 1000 μm, and a minimum spacing of 10 μm to 500 μm. However, GEM structures are known in the art. For example, Sauli teaches (Fig. 4f; Tables 1 and 3) that a GEM structure have diameters D of for example, 110 μm and 130 μm, and a minimum spacing P of 140 μm to 200 μm. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide passages in the modified detector of Danielsson *et al.* having a minimum diameter of between 10 μm and 1000 μm, and a minimum spacing of 10 μm to 500 μm, in order to align the passages to the holes in the known GEM structure.

Response to Amendment

8. The declaration under 37 CFR 1.132 filed 8 May 2006 is insufficient to overcome the rejection of amended claims based upon Danielsson *et al.* as set forth in the last Office action because: the evidence relied upon should establish that the differences in results are in fact unexpected and unobvious and of both statistical and practical significance (MPEP § 716.02(b)). First it is noted that the evidence provided in the declaration is a computer simulation based on unstated models and parameters. Thus

it is unclear that differences in the computer simulation results of absorption efficiencies necessarily predict a statistically significant difference in actual conversion performance. In addition, the declaration provides a comparison between a second computer simulation of GEM-foil coated with 5 μm copper on top with a third computer simulation of GEM-foil coated with 5 μm gold on top. The inventor also offers the opinion that the magnitude of the enhanced absorption efficiency of the third simulation was greater than the inventor would have expected. However, it should be noted that copper has an atomic number of 29 whereas gold has an atomic number of 79. Further, Danielsson *et al.* state (column 1, lines 53-57) that "The converter is usually made as a thin plate of some heavy metal like copper or iron, but molybdenum, chromiun or tungsten are equally suitable. In principle any material could be used, but the efficiency of the device will increase with increasing atomic number". Thus, the cited prior art teaches an increase in device efficiency is to expected when the atomic number is increased (*e.g.*, from 29 to 79).

In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh the evidence of obviousness.

Response to Arguments

9. Applicant's arguments with respect to amended claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SL

DAVID PORTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800